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AIR FORCE HUMAN RESOURCES LABORATORY
BROOKS AIR FORCE BASE, TEXAS

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HUMAN

RESOURCES

TRENDS IN TRAINING PERFORMANCE:

1972 - 1974

By

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Lackland Air Force Base, Texas 78236

December 1976

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This final report was submitted by Personnel Research Division, Air Force Human Resources Laboratory, Lackland Air Force Base, Texas 78236, under project 7719, with HQ Air Force Human Resources Laboratory (AFSC), Brooks Air Force Base, Texas 78235. Mr. James M. Wilbourn, Personnel Research Division, was the project monitor.

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This technical report has been reviewed and is approved.

LELAND D. BROKAW, Technical Director
Personnel Research Division

Approved for publication.

DAN D. FULGHAM, Colonel, USAF
Commander

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20. ABSTRACT (Continue on reverse side if necessary and identify by block number)												
<p>This research reports the aptitudinal and background characteristics of non-prior service enlistees who graduated or eliminated from basic military and technical training from 1972 through 1974. Comparative analyses were made by racial subgroup, sex, educational level, region of enlistment, aptitude scores, and type of assignment. It was found that the number of Blacks enlisting exceeded their proportion in the population as a whole. Elimination rates have generally decreased in basic military training (BMT) over the years, but have steadily increased in technical training (TT), especially for the total female population and Black males. In some instances eliminees had higher aptitude mean scores than graduates. It was found that college graduates have higher elimination rates than non-college graduates in BMT. In TT, the higher the number of years of education, the lower</p>												

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the attrition rates. Considering age as an attrition factor, both 17-year-old males and females had elimination rates that exceeded all other age groups. It appears considerable amounts of money may be saved if a mandatory 18-year-old enlistment standard be required. Overall, attrition is not related to region of enlistment except in Areas 3 (South) and 4 (Southwest) where a considerable high attrition rate is evidenced.

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PREFACE

This research was conducted under project 7719, Air Force Personnel System Development on Selection, Assignment, Evaluation, Quality Control, Retention, Promotion, and Utilization; task 771902, Exploration of Methods for Increasing the Effectiveness of Personnel Programs.

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TRENDS IN TRAINING PERFORMANCE: 1972 - 1974

I. INTRODUCTION

In the 1970-1972 time period, studies were done to predict the quantity, quality, educational level, and racial characteristics of those young men and women who would enlist in an all-volunteer military service (Cook, 1970; Gates, 1970; Saber Volunteer, 1971; Vitola & Brokaw, 1973; Vitola & Valentine, 1971). Results of these studies indicated that, while the Air Force would experience difficulty procuring high aptitude personnel with the educational levels of the 1970-1972 time frame, a sufficient number of qualified personnel could be recruited to accomplish the Air Force mission.

To offset any possible decrease in Air Force input under all-volunteer conditions, other pre-volunteer studies explored the feasibility of expanded utilization of women in career fields which were traditionally occupied by males. The aptitude data from these studies, assessing female potential in the Mechanical and Electronics technical areas, supported the subsequent Air Force decision to recruit women for entrance into career fields formerly dominated by male enlistees (Vitola, Mullins, & Weeks, 1974; Vitola & Wilbourn, 1971).

In January of 1973, the Air Force began recruiting its personnel without benefit of draft pressure as a motivator for enlistment. In retrospect, it has been suggested by some that the 1973-1974 time period of economic recession and rising rate of unemployment replaced the draft as a motivating force and put the Air Force in a "buyer's market" posture.

To accomplish its designated mission, each calendar year, the Air Force enlists and trains about 65,000 to 75,000 male and female recruits. The basic, technical, and on-the-job training of these recruits represents a major expenditure of Air Force resources. It is the purpose of this study to compare the training performance of the 1972 accessions (draft-motivated) with that of the 1973-1974 accessions (volunteer force). Data will be presented on accessions depicting the dimensions of aptitude, race, age, sex, education, and geographic area of enlistment. Comparisons will be made between those enlistees who successfully completed basic military training (BMT) and technical training (TT) with those who were eliminated.

II. METHOD

The population consisted of male and female non-prior service basic trainees who enlisted in the Air Force from 1972 through 1974 (Table 1). Biographical, aptitudinal, and training performance data on each enlistee were derived from the Processing and Classification of Enlistees (PACE) and technical training (T-68) files maintained by the Computational Sciences Division, Air Force Human Resources Laboratory. Specific data elements required for comparative analyses included age at enlistment, race, geographic region of enlistment, type of assignment, Airman Qualifying Examination (AQE)/Armed Services Vocational Aptitude Battery (ASVAB) aptitude scores, years of education and graduation/elimination from BMT and TT.

Armed Forces Qualification Test (AFQT) scores were obtained for males from 1972 through 1974 and for females in 1974. During 1972 and 1973, males were required to take the AFQT and female enlistees the Armed Forces Women's Selection Test (AFWST). In 1974, male and female applicants were given the ASVAB from which an AFQT score is derived from a combination of the Word Knowledge, Arithmetic Reasoning, and Space Perception subtests. Either AQE or ASVAB scores were used to compare aptitude levels between subgroups. Comparisons across these two aptitude measures are appropriate since the two tests are equivalent for the following reasons: (a) both yield four aptitude composites: Mechanical, Administrative, General, and Electronics, (b) both yield identical centile intervals (01, 05, 10, . . . 95) which were developed so that five percent of the normative sample falls within each of the twenty intervals of the scale, (c) both are normed against the same Project Talent reference tests (Dailey, Shaycroft, & Orr, 1962), and (d) the two tests' aptitude composites are equivalent in prediction of the probability of technical school success for courses in the Mechanical, Administrative, General, and Electronics areas (Vitola, Mullins, & Croll, 1973).

Table 1. Sample Population

Year	Basic Military Training				Technical Training			
	Male	%	Female	%	Male	%	Female	%
1972 Black	10,481	13	628	13	7,320	14	472	14
Non-Black	71,180	87	4,073	87	46,943	86	2,917	86
Total	81,661	100	4,701	100	54,263	100	3,389	100
1973 Black	11,005	15	1,195	16	8,883	16	957	16
Non-Black	61,108	85	6,488	84	46,245	84	4,941	84
Total	72,113	100	7,683	100	55,128	100	5,898	100
1974 Black	11,375	18	1,549	17	7,712	19	1,175	19
Non-Black	53,030	82	7,403	83	33,816	81	5,103	81
Total	64,405	100	8,952	100	41,528	100	6,278	100

Frequency and percentage distributions were generated for both male and female enlistees who were graduated or eliminated from either basic or technical training in calendar years 1972-1974. In TT, the sample was restricted to 3ABR and 3AQR courses only. Means and standard deviations for the three yearly groups were computed on the four AQE/ASVAB composites. Score distributions for each year were obtained for each of four levels of education: 16 or more years completed, 13 through 15 years, 12 years, and 11 years or less. Each yearly group, males and females separately, was divided into Black and non-Black racial subgroups. Various comparisons were made on aptitude level, type of enlistment, education completed, age, and geographic area of enlistment.

III. RESULTS AND DISCUSSION

Disposition from Training by Racial Subgroup

In the Gates report on the all-volunteer force, some social actions groups suggested that as unemployment increased, the number of blacks to be enlisted in the United States Air Force would decrease (Gates, 1970). Certainly, it was anticipated that the proportion of Blacks enlisted in the armed services would be less than the proportion they represent in the population at large (about 12%).

The data shown in Table 1 do not lend credence to those projections. In fact, during the 1972-1974 time frame, the Air Force enlisted the following proportions of Blacks by sex: 1972, 13 percent male, 13 percent female; 1973, 15 percent male, 16 percent female; and 1974, 18 percent male, 17 percent female. Regardless of economic factors, the proportion of Blacks that enlisted in 1972 through 1974 was greater than the proportion of Blacks in the population at large.

- The data presented in Table 2 indicate some interesting trends regarding elimination rates from training. In most instances, regardless of sex or racial subgroup, the overall elimination rate in BMT for 1973-1974 is less than the elimination rate of 1972, a year in which the draft was still in effect. If we consider the approximate cost per individual graduate from basic training is about \$1,700 and the cost of the average eliminee to be \$1,400¹, then, in an all-volunteer environment, Air Force has significantly reduced the cost related to attrition in basic training.

On the other hand, in technical training, regardless of sex or racial subgroup, the rate of attrition has steadily increased from 1972 to 1974. There was an increase in attrition rate for females as opposed to

¹Cost data were obtained from the Air Force Military Training Center (AFMTC) Comptroller Division/ACM, Lackland AFB, TX. Actual cost per graduate is \$1,689 for males, \$1,675 for females. Cost per eliminee equals cost per graduate (\$1,700) minus savings due to early separation (\$300).

Table 2. Disposition from Training by Sex and Racial Subgroup, 1972 - 1974

Training Program	Racial Subgroup	1972			1973			1974		
		N	Graduates %	Eliminees %	N	Graduates %	Eliminees %	N	Graduates %	Eliminees %
BMT	Black	10,481	93	7	<u>Male</u>					
	Non-Black	71,180	89	11	11,005	94	6	11,375	92	8
	Total	81,661	90	10	61,108	92	8	53,030	90	10
					72,113	92	8	64,405	91	9
					<u>Female</u>					
	Black	628	93	7	1,195	96	4	1,549	95	5
	Non-Black	4,073	92	8	6,488	95	5	7,403	93	7
	Total	4,701	92	8	7,683	96	4	8,952	93	7
TT	Black	7,320	92	8	<u>Male</u>					
	Non-Black	46,943	95	5	8,883	89	11	7,712	86	14
	Total	54,263	95	5	46,245	94	6	33,816	92	8
					55,128	93	7	41,528	91	9
					<u>Female</u>					
	Black	472	90	10	957	84	16	1,175	83	17
	Non-Black	2,917	94	6	4,941	90	10	5,103	87	13
	Total	3,389	94	6	5,898	89	11	6,278	86	14

males and Black males compared to non-Black males. The overall rate of increase in attrition rates for both female racial subgroups was the same (7%) from 1972 to 1974.

Armed Forces Qualification Test Performance

The Department of Defense requires that all individuals wishing to enlist in the military service be administered the AFQT. This test yields a centile score (01, 02, 03...99) which is translated into a mental ability level designated Category I (93-99), Category II (65-92), Category III (31-64), and Category IV (10-30). Table 3 displays data showing the number and percentage of graduates and eliminees by sex and AFQT Category for 1972-1974.

Inspection of the male data of Table 3 reveals that compared to 1972, Air Force has experienced a loss of Category I personnel in 1973-1974, but, of those who enlisted, a lesser percentage are eliminated from basic training. This trend appears to hold in a majority of instances for all categories. This is not the case for males who complete basic training and are sent to technical training schools. With the exception of Category IV personnel, the percentage of TT attrition by category in 1973-1974 is greater than it was in 1972. In 1973, it appeared that there was a distinct relationship between category and rate of attrition. The higher the level of mental ability, the lower the rate of attrition. This phenomenon did not obtain in 1974 for either males or females. Apparently, there are factors in the technical training environment, other than aptitude, that may affect attrition rates.

Although the proportion of female enlistees scoring in Categories I through IV in 1974 was almost identical with their male counterparts, there are appreciable differences in rate of female versus male attrition in technical training, especially in Categories I and II. Again, this substantiates the possibility that within the technical training environment, there are factors other than aptitude that could be "driving" the attrition rate.

Disposition from Training by Educational Level

For over a decade, years of formal education has been found to be positively correlated with the level of aptitude and a valid predictor of trainability and adaptability to Air Force life (Vitola, Valentine, & Tupes, 1967; Gruszke, Guinn, & Stauffer, 1970; Vitola & Wilbourn, 1971). Table 4 data show the education levels for graduates and eliminees from basic and technical training for 1972 through 1974.

A comment should be made concerning the magnitude of incomplete data on educational levels for the 1974 male and female trainees. In the 1974 May-December time period, format changes to the personnel files resulted in an unusually high rate of missing/incomplete data. Educational data were not available for five percent of the male and female population. Therefore, discussion concerning 1974 educational data should be considered tentative.

In basic training during the 1972-1974 time period, high school graduates and eliminees with one to three years of college demonstrated lower attrition rates than enlistees who were either college graduates or high school non-graduates. It may be that college graduates are unable to adapt to the regimentation of BMT and a learning situation which they do not consider challenging or meaningful.

Air Force procurement policy in recent years has been changed to encourage enlistment of personnel with higher educational levels. If the relationship found in the BMT data between attrition and years of education were found in the technical training area also, the emphasis on recruiting those with higher educational levels would be questionable. However, this phenomenon is not found in the technical training program. In only one instance (1973 males) was there a deviation from the trend where the greater the number of years of education, the lower the attrition rate. It appears that the traditional relationship between education and academic success is apparent in the TT environment where comprehension of the technical curriculum is positively related to an individual's educational level.

AQE/ASVAB Performance BMT

Tables A1 through A6 in Appendix A present descriptive data showing average aptitude scores for 1972-1974 male and female graduates and eliminees from basic and technical training.

Inspection of the total populations of Tables A1 and A2 reveals that, in all but two instances, the average aptitude scores of eliminees in BMT are less than the average aptitude scores of those who

Table 3. Disposition from Training by Mental Category and Sex, 1972 - 1974

Training Program	AFQT Category	1972			1973			1974		
		N	Graduates %	Eliminees %	N	Graduates %	Eliminees %	N	Graduates %	Eliminees %
BMT	Male	Category I	4,657	93	7	3,561	95	5	2,294	94
		Category II	31,964	91	9	28,326	94	6	24,248	91
		Category III	40,871	89	11	37,874	92	8	37,138	90
		Category IV	3,671	89	11	1,773	91	9	340	91
		Incomplete Data ^a	498		579			385		
	Total ^b	81,661	90	10	72,113	92	8	64,405	91	9
	Female	Category I						364	93	7
		Category II						3,423	94	6
		Category III						5,079	93	7
		Category IV						13	69	31
		Incomplete Data ^a						73		
	Total ^b							8,952	93	7
TT	Male	Category I	2,844	96	4	2,557	95	5	1,339	92
		Category II	21,193	95	5	21,331	94	6	14,920	90
		Category III	27,519	95	5	29,736	93	7	24,901	92
		Category IV	2,485	80	20	1,312	90	10	232	88
		Incomplete Data ^a	222		192			136		
	Total ^b	54,263	95	5	55,128	93	7	41,528	91	9
	Female	Category I						194	82	18
		Category II						2,302	84	16
		Category III						3,734	88	12
		Category IV						7	86	14
		Incomplete Data ^a						41		
	Total ^b							6,278	86	14

^aNumber of enlistees with missing AFQT data.

^bIn 1972-1973, females were administered the Armed Forces Women's Selection Test (AFWST), males were administered the AFQT. In 1974, all enlistees were administered the ASVAB from which an AFQT score is derived.

Table 4. Disposition from Training by Sex and Years of Education Completed 1972 - 1974

Training Program	Years of Education	1972			1973			1974		
		N	Graduates %	Eliminees %	N	Graduates %	Eliminees %	N	Graduates %	Eliminees %
BMT		Male								
	16 years or more	1,759	86	14	1,167	69	31	747	73	27
	13-15 years	5,686	95	5	4,210	96	4	2,357	93	7
	12 years	63,290	91	9	58,733	94	6	54,206	91	9
	11 years or less	10,923	79	21	7,993	85	15	3,927	85	15
	Incomplete Data	3			10			3,168		
	Total	81,661	90	10	72,113	92	8	64,405	91	9
		Females								
	16 years or more	78	81	19	175	98	2	207	88	12
	13-15 years	372	97	3	633	97	3	506	97	3
TT	12 years	4,244	92	8	6,862	95	5	7,556	94	6
	11 years or less	7	86	14	12	92	8	194	91	19
	Incomplete Data	0			0			489		
	Total	4,701	92	8	7,683	96	4	8,952	93	7
		Male								
	16 years or more	833	98	2	493	96	4	308	95	5
	13-15 years	3,714	97	3	3,064	97	3	1,493	94	6
	12 years	42,920	95	5	45,850	93	7	35,162	91	9
	11 years or less	6,795	90	10	5,718	88	12	2,356	83	17
	Incomplete Data	1			3			2,209		
	Total	54,263	95	5	55,128	93	7	41,528	91	9
		Female								
	16 years or more	28	100	0	96	95	5	103	93	7
	13-15 years	255	96	4	441	92	8	354	89	11
	12 years	3,101	93	7	5,354	89	11	5,333	87	13
	11 years or less	5	100	0	7	57	43	115	70	30
	Incomplete Data	0			0			373		
	Total	3,389	94	6	5,898	89	11	6,278	86	14

graduated. Aptitude scores within racial subgroups varied in more instances than did the aptitude scores of the total population. In eight instances (four among the female accessions and four within the male population), the average score of Black eliminees in BMT was equal to or greater than the average score of graduates during the 1972-1974 period.

AQE/ASVAB Performance TT

For comparison of graduate and eliminee aptitude scores in the TT environment, enlistees with a single selector aptitude index were grouped into the four aptitude areas at the specific selector aptitude index level required for entry into their particular training program (Tables A3 through A6). For example, if an individual enters a mechanical training course with a mandatory selector aptitude index (AI) of M-50, his actual aptitude score on the Mechanical AI was compared with others entering programs with the same selector AI prerequisite. Similarly, those entering courses requiring specific Administrative, General, or Electronic aptitude minimums are included under the corresponding level of the selector aptitude area. In general, the trend in aptitude level between graduates and eliminees in TT is similar to that in BMT.

Reversals where eliminee average scores exceeded the score of their graduate counterparts were found more often among females in the mechanical area or among the Black male enlistees. In some instances, these variations in scores were most likely due to small sample sizes. This type of reversal also substantiates the hypothesis that factors other than aptitude may be influencing the rate of attrition in TT.

Disposition from Training by Age Group

The distributions in Table 5 present the 1972-1974 graduates and eliminees from basic and technical training by sex and age level. The comparative data by age level reveals dramatic differences in attrition rate between 17-year-olds and the older age groups. The attrition rate for 17-year-old males exceeds that of all other ages. The magnitude of disparity noted between these age groups suggest that it might be cost-effective if Air Force policy makers would consider a mandatory age minimum in the development of future enlistment standards.

Table 5 also shows graduation and elimination rates for females in the 1972-1974 time period. Although the population is small, the same trend is indicated for the 1974 17-year-old females as was observed for 1972-1974 males (in 1972-1973, females had to be 18 years of age to enlist).

Although the BMT rate of attrition among females at all age levels is less than the rate of attrition of males, proportionately more females are eliminated in technical training than are males. In addition, an appreciable increase in female attrition in technical training at all age levels is noted in the 1972-1974 time period. This phenomenon may be due to an increase in assignment of females to the industrial career fields and their subsequent dislike or dissatisfaction with the career field in which they enlisted and/or problems they encounter in comprehending the technical training material or equipment operation.

Table 6 lists the amount of resources the Air Force has expended on 17-year-old eliminees from basic and technical training for the 1972-1974 time period. Based on information obtained from the Air Force Military Training Center, Comptroller Division, Lackland AFB, Texas, the approximate cost per basic training eliminee was estimated at \$1,400. (The total cost per graduate \$1,700, minus the amount of estimated savings due to separation prior to completion of BMT.) Since eliminees remain at Lackland for an average of 27 days prior to completion of out-processing, a maximum of \$300 savings for pay and related costs were deducted from the total cost figure.

In technical training, the cost per graduate in 3-level airman basic resident (3ABR) course ranges from \$1,700 to \$34,000.² The time to completion and blocks of instruction vary considerably per course making it very difficult to determine an average cost per eliminee. An extremely conservative dollar cost of \$1,000 per technical training eliminee was used for comparative purposes to calculate the overall cost of such an eliminee. The formula used to estimate cost per TT eliminee is as follows: BMT graduate cost (\$1,700) plus TT eliminee cost (\$1,000) equals an overall estimated cost of \$2,700.

Inspection of Table 6 data indicates that the Air Force is investing a considerable amount of training dollars in a specific age group of accessions that appear to be a poor training investment. This statement is

²Range of costs derived from the ATC Directorate of Management Analysis document entitled *Cost Factors*.

Table 5. Disposition from Training by Age Group and Sex, 1972 - 1974

Training Program	Age in Years	1972			1973			1974		
		N	Graduates %	Eliminees %	N	Graduates %	Eliminees %	N	Graduates %	Eliminees %
Male										
BMT	17	1,704	79	21	2,773	86	14	2,540	85	15
	18	18,318	90	10	19,495	93	7	17,441	91	9
	19	26,674	90	10	22,574	94	6	19,703	92	8
	20	19,394	90	10	13,139	93	7	10,998	91	9
	21	7,297	90	10	6,196	92	8	5,720	91	8
	22	3,733	90	10	3,518	91	9	3,180	89	11
	23	2,119	90	10	2,097	89	11	2,170	87	13
	24+	2,422	89	11	2,321	87	13	2,653	86	14
Total	81,661	90	10	72,113	92	8	64,405	91	9	
TT	17	1,076	89	11	2,038	87	13	1,542	86	14
	18	12,314	95	5	15,243	93	7	11,539	91	9
	19	18,243	95	5	17,666	94	6	12,917	92	8
	20	13,025	95	5	10,121	94	6	7,226	91	9
	21	4,747	95	5	4,630	93	7	3,613	91	9
	22	2,308	95	5	2,538	93	7	1,935	92	8
	23	1,232	95	5	1,429	93	7	1,271	91	9
	24+	1,318	93	7	1,463	92	8	1,485	90	10
Total	54,263	95	5	55,128	93	7	41,528	91	9	
Female										
BMT	17	0	0	0	0	0	0	39	85	15
	18	877	94	6	1,425	97	3	1,627	92	8
	19	1,601	91	9	2,321	95	5	2,447	95	5
	20	856	91	9	1,303	94	6	1,413	93	7
	21	500	91	9	861	96	4	1,017	92	8
	22	341	90	10	555	95	5	696	94	6
	23	200	91	9	411	97	3	518	94	6
	24+	326	93	7	807	94	6	1,195	94	6
Total	4,701	92	8	7,683	96	4	8,952	93	7	
TT	17	0	0	0	0	0	0	22	68	32
	18	683	93	7	1,122	90	10	1,131	88	12
	19	1,176	94	6	1,831	89	11	1,781	88	12
	20	608	92	8	969	88	12	1,009	83	17
	21	350	92	8	670	89	11	727	86	14
	22	226	95	5	430	88	12	469	85	15
	23	128	98	2	297	88	12	354	84	16
	24+	218	93	7	579	89	11	785	86	14
Total	3,389	94	6	5,898	89	11	6,278	86	14	

**Table 6. Resources Expended for 17-Year-Old
Basic and Technical Training Eliminees,
1972 - 1974**

Calendar Year	Number of Eliminees	Cost per Eliminee	Total Cost
Basic Military Training			
1972	366	\$1,400	\$ 512,400
1972	391	\$1,400	\$ 547,400
1974	392	\$1,400	\$ 548,800
Total	1,149	\$1,400	\$1,608,600
Technical Training			
1972	121	\$2,700	\$ 326,700
1973	270	\$2,700	\$ 729,000
1974	226	\$2,700	\$ 610,200
Total	617	\$2,700	\$1,665,900

supported by the following facts: (a) 17-year-olds demonstrate the lowest aptitude potential of all age groups (Vitola, Guinn, & Magness, 1976), (b) 17-year-olds constitute the largest proportion of high school non-graduates, and previous research has shown that high school non-graduates do not adapt to military life, as well as high school graduates (Kantor & Guinn, 1975), and (c) as indicated in Table 5, this age group has the highest rate of attrition from both basic and technical training.

The data in Table 7 show the training costs which could have been avoided had the Air Force required a mandatory 18-year-old enlistment standard in the 1972-1974 time period. For example, in 1972 there were 1,704 17-year-old recruits. Of that total, 1,338 graduated and 366 were eliminated from BMT. At a cost of \$1,400 per eliminee, the total eliminee cost for 1972 was \$512,000.

To reduce these costs, applicants from the other age groups could have been recruited instead of the 17-year-olds. For illustrative purposes, the 18- and 19-year-old age groups were selected for additional recruitment to replace the 17-year-old population, since these age groups comprise approximately 55 percent of the accession population. Both the 18- and 19-year-old age groups had an elimination rate of 10 percent in 1972. Based on this elimination rate, a total of 1,487 18- and 19-year-old recruits would be needed to produce the required number (1,338) of graduates from BMT. The total number of 18- and 19-year-olds required to replace the 17-year-old deficit represents 217 fewer enlistees to produce the same number of graduates. However, the savings associated with reduced recruiting requirements were not added to the cost avoidance total. Based on the 10 percent elimination rate for the 18- and 19-year-old age groups, there would be a total of 149 eliminees with associated costs of \$208,600. Subtracting the cost of the 18- and 19-year-old eliminees from the cost of the 17-year-old eliminee group indicates that a cost avoidance of \$303,800 would have been effected in 1972 by the 18-year-old enlistment standard.

If the same procedural rationale is applied to the 1972 technical training costs, the resultant cost avoidance totals \$191,700. Had no 17-year-olds been enlisted in 1972, savings in training costs in both BMT and TT would have equalled \$495,500. Elimination of 17-year-olds in 1973 and 1974 represent similar savings. Over the three-year period, total cost avoidance would have been \$1,743,300.

Disposition from Training by Type of Enlistee

It has been hypothesized that a guaranteed job assignment should have a beneficial effect on an individual's perceived satisfaction in military service. If the individual is more satisfied, he should be more motivated to succeed in training which, in turn, should result in less probability of attrition. The data presented in Table 8 show slight differences in elimination rates between guaranteed and non-guaranteed assignment male enlistees in both training programs. These differences are not reflected in the female population. As far as "motivation to succeed" is concerned, little, if any, relationship is evidenced as a function of guaranteed job assignment.

Table 7. Resources Expended for 17-Year-Old Basic and Technical Training Eliminees and Possible Cost-Avoidance by Mandatory 18-Year-Old Enlistment Standard 1972 - 1974

Training Program (1)	Year (2)	17-Year-Old					18- and 19-Year-Old										Total Cost of Elim's Col 6 x Col 3 (7)	Total Cost of Elim's Col 16 x Col 3 (17)	Total Cost Avoidance Col 7 - Col 17 (18)		
		Cost Per Elim (3)	Total Input (4)	Number Grad (5)	Number Elim (6)	Required Input to Replace 17- Year-Old Grads					Number of Graduates					Number of Eliminees					
						Age 18 (8)	Age 19 (9)	Total (10)	Age 18 (11)	Age 19 (12)	Total (13)	Age 18 (14)	Age 19 (15)	Total (16)							
BMT	1972	\$1,400	1,704	1,338	366	743	744	1,487	669	669	1,338	74	75	149		208,600	303,800				
	1973		2,773	2,382	391	1,281	1,267	2,548	1,191	1,191	2,382	90	76	166		232,400	315,000				
	1974																				
	M		2,540	2,154	386	1,184	1,171	2,355	1,077	1,077	2,154	107	94	201		281,400	259,000				
	F ^a		39	33	6	36	-	36	33	33	-	33	3	-	3		4,200	4,200			
Total BMT Cost Avoidance (1972-1974)																	\$ 882,000				
TT	1972	\$2,700	1,076	955	121	503	502	1,005	478	477	955	25	25	50		135,000	191,700				
	1973		2,038	1,768	270	951	940	1,891	884	884	1,768	67	56	123		332,100	396,900				
	1974																				
	M		1,542	1,323	219	728	718	1,446	662	661	1,323	66	57	123		332,100	259,200				
	F ^a		22	15	7	22	-	22	20	20	-	20	2	-	2		5,400	13,500			
Total TT Cost Avoidance (1972-1974)																	\$ 861,300				
BMT/TT (1972-1974)																	\$1,743,300				
TOTAL																	\$1,743,300				

^a Prior to 1974 female enlistees had to be 18 years of age.

Table 8. Disposition from Training by Type of Enlistment and Sex, 1972 - 1974

Type of Training	Type of Enlistment	1972			1973			1974		
		N	Graduates %	Eliminees %	N	Graduates %	Eliminees %	N	Graduates %	Eliminees %
BMT	Non-Guarantee	Male								
		55,284	89	11	38,329	92	8	43,571	90	10
		22,273	91	9	20,026	93	7	12,864	92	9
		4,104	92	8	13,758	92	8	7,970	91	9
		81,661	90	10	72,113	92	8	64,405	91	9
	Total	Female								
		3,690	91	9	3,912	96	4	2,963	94	6
		946	93	7	2,475	96	4	4,235	93	7
		65	94	6	1,296	95	5	1,234	94	6
		4,701	92	8	7,683	96	4	8,952	93	7
TT	Non-Guarantee	Male								
		35,410	94	6	29,020	92	8	27,659	90	10
		15,997	97	3	15,514	94	6	8,509	93	7
		2,856	95	5	10,594	94	6	5,360	93	7
		54,263	95	5	55,128	93	7	41,528	91	9
	Total	Female								
		2,599	93	7	2,918	91	9	2,181	87	13
		743	96	4	1,953	88	12	2,888	86	14
		47	91	9	1,027	86	14	1,209	84	16
		3,389	94	6	5,898	89	11	6,278	86	14

Disposition from Training by Geographic Area of Enlistment

Tables 9 and 10 indicate the geographic area of enlistment for male and female graduates and eliminees in the 1972-1974 time frame. The male data from Table 9 lead to the conclusion that specific area of enlistment has no appreciable effect on rate of attrition from basic or technical training. However, there is one trend that may bear further observation. Male enlistees from Areas 3 (South) and 4 (Southwest) appear to maintain a consistently high rate of attrition in technical training. Similar results were apparent in the female population (Table 10). No definite trends between area of enlistment and rate of attrition from basic training were noted. In 1974, Areas 3 and 4 female enlistees also evidenced a high rate of attrition similar to their male counterparts in TT.

Table 9. Graduate/Eliminee Male Trainees by Enlistment Area, 1972 - 1974

Training Program	Enlistment Area ^a	1972			1973			1974		
		N	Graduates %	Eliminees %	N	Graduates %	Eliminees %	N	Graduates %	Eliminees %
BMT	1	9,669	88	12	8,762	92	8	8,175	91	9
	2	10,177	90	10	8,889	92	8	7,885	90	10
	3	12,466	90	10	11,673	92	8	11,038	90	10
	4	12,834	90	10	10,148	93	7	8,968	91	9
	5	14,011	89	11	12,035	92	8	10,435	89	11
	6	12,284	90	10	12,050	93	7	10,442	92	8
	7	9,950	90	10	8,328	94	6	7,087	91	9
	8	270	93	7	228	96	4	375	87	13
	Total	81,661	90	10	72,113	92	8	64,405	91	9
TT	1	6,399	95	5	6,546	93	7	5,179	92	8
	2	6,851	95	5	6,808	92	8	4,986	91	9
	3	8,370	94	6	8,994	91	9	7,166	89	11
	4	8,516	94	6	7,827	92	8	5,877	90	10
	5	9,160	94	6	9,138	93	7	6,503	91	9
	6	8,112	96	4	9,254	95	5	6,986	93	7
	7	6,669	97	3	6,376	95	5	4,620	92	8
	8	186	92	8	185	92	8	211	91	9
	Total	54,263	95	5	55,128	93	7	41,528	91	9

^aArea 1. Maine, New Hampshire, Vermont, Massachusetts, Connecticut, Rhode Island, New York.

Area 2. New Jersey, Pennsylvania, Delaware, Maryland, West Virginia, Virginia, District of Columbia.

Area 3. North Carolina, South Carolina, Georgia, Florida, Alabama, Mississippi, Tennessee.

Area 4. Arkansas, Louisiana, Oklahoma, New Mexico, Texas, Arizona.

Area 5. Ohio, Indiana, Michigan, Illinois, Kentucky.

Area 6. Washington, Oregon, California, Nevada, Idaho, Montana, Utah, Alaska, Hawaii.

Area 7. Missouri, Iowa, Minnesota, North Dakota, South Dakota, Kansas, Nebraska, Colorado, Wyoming, Wisconsin.

Area 8. Other than Areas 1 through 7.

Table 10. Graduate/Eliminee Female Trainees by Enlistment Area, 1972 - 1974

Training Program	Enlistment Area ^a	1972			1973			1974		
		N	Graduates %	Eliminees %	N	Graduates %	Eliminees %	N	Graduates %	Eliminees %
BMT	1	497	92	8	989	96	4	1,194	93	7
	2	623	91	9	1,039	96	4	1,146	94	6
	3	769	92	8	1,253	94	6	1,511	92	8
	4	842	91	9	974	96	4	1,154	94	6
	5	747	90	10	1,394	95	5	1,438	93	7
	6	669	91	9	1,139	96	4	1,404	95	5
	7	549	95	5	883	97	3	1,070	93	7
	8	5	100	0	12	92	8	35	100	0
	Total	4,701	92	8	7,683	96	4	8,952	93	7
TT	1	362	95	5	744	91	9	838	87	13
	2	459	93	7	791	91	9	825	89	11
	3	574	94	6	1,000	87	13	1,058	79	21
	4	600	89	11	769	85	15	846	84	16
	5	519	94	6	1,075	88	12	996	88	12
	6	454	96	4	850	91	9	970	88	12
	7	418	96	4	661	91	9	720	90	10
	8	3	67	33	8	82	18	25	96	4
	Total	3,389	94	6	5,898	89	11	6,278	86	14

^aArea 1. Maine, New Hampshire, Vermont, Massachusetts, Connecticut, Rhode Island, New York.

Area 2. New Jersey, Pennsylvania, Delaware, Maryland, West Virginia, Virginia, District of Columbia.

Area 3. North Carolina, South Carolina, Georgia, Florida, Alabama, Mississippi, Tennessee.

Area 4. Arkansas, Louisiana, Oklahoma, New Mexico, Texas, Arizona.

Area 5. Ohio, Indiana, Michigan, Illinois, Kentucky.

Area 6. Washington, Oregon, California, Nevada, Idaho, Montana, Utah, Alaska, Hawaii.

Area 7. Missouri, Iowa, Minnesota, North Dakota, South Dakota, Kansas, Nebraska, Colorado, Wyoming, Wisconsin.

Area 8. Other than Areas 1 through 7.

IV. SUMMARY

The purpose of this study was to investigate the characteristics of male and female graduates and eliminatees from basic and technical school training. Data for 1972 through 1974 were presented for these categories of enlisted personnel across various dimensions of race, mental ability, aptitude, education, age, and geographic area of enlistment.

Analysis of the data of this study leads to the following conclusions:

1. Regardless of race or sex, in the all-volunteer force environment, elimination rates have generally decreased in basic training. However, the attrition rates have steadily increased in technical school training.
2. Generally, male and female eliminatees in basic and technical training had aptitude scores that were lower than their graduate contemporaries. However, this phenomenon did not hold true within racial/sex subgroups. In some instances, Black and/or female eliminatees evidenced aptitude scores equal to or greater than graduates.
3. In basic training, college graduates have a greater attrition rate than college non-graduates. In technical training, the data generally support the hypothesis that the greater the number of years of education, the less the attrition.
4. Across the dimensions of education and aptitude for both males and females, the percentage of attrition in technical training schools is rising. The lack of relationship between the usual academic indicators of training success lends support to the hypothesis that there may be perceptual and motivational factors within the technical training school environment affecting attrition rates.

5. The relationship between training losses and age indicates that consideration should be given to requiring a mandatory 18-year-old enlistment standard (no waiver). The 17-year-old group (male and female) has an elimination rate in basic and technical training that exceeds all other age groups.

6. Generally speaking, type of assignment (guaranteed/non-guaranteed) does not appear to have a great deal of effect on basic and technical training attrition rates.

7. With few exceptions, it seems that an enlistee's geographic area of enlistment is not related to attrition rates in basic and technical school training. The exceptions noted are Area 3 (South) and Area 4 (Southwest). Enlistees from these areas consistently maintain a high rate of attrition, especially in technical training.

It is recognized that new and more stringent enlistment standards will be in effect in calendar year 1975 which will change the characteristics of first-year accessions. Follow-on research should be conducted to determine the impact of changing enlistment standards on rate of attrition in basic and technical training.

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APPENDIX A: AQE/ASVAB PERFORMANCE

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Table A1. Mean AQE/ASVAB Scores for Male Graduates and Eliminees in Training by Racial Subgroup 1972 - 1974

Training Program	Test/Aptitude Index	1972				1973				1974				
		Graduate		Eliminee		Graduate		Eliminee		Graduate		Eliminee		
		Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	
Black														
BMT	AQE/ASVAB	Mechanical	44	18	42	18	46	18	44	18	42	18	40	18
		Administrative	46	19	43	18	46	19	44	18	46	19	46	20
		General	51	17	49	15	51	16	51	14	59	17	61	16
		Electronics	47	18	45	17	49	18	46	17	54	16	55	17
Non-Black														
	AQE/ASVAB	Mechanical	63	20	57	20	63	20	57	19	64	20	60	20
		Administrative	59	21	53	20	54	20	49	19	55	20	51	20
		General	64	18	59	17	61	18	56	17	67	18	65	17
		Electronics	66	20	59	19	65	19	59	18	68	19	64	18
Total														
	AQE/ASVAB	Mechanical	60	21	56	20	60	20	56	20	60	21	57	21
		Administrative	57	21	52	20	53	20	48	20	53	20	50	20
		General	62	19	58	17	59	18	56	17	65	18	64	17
		Electronics	63	21	58	20	62	20	57	19	63	18	63	18

Table A2. Mean AQE/ASVAB Scores for Female Graduates and Eliminees in Training by Racial Subgroup 1972 - 1974

Training Program	Test/Aptitude Index	1972				1973				1974					
		Graduate		Eliminee		Graduate		Eliminee		Graduate		Eliminee			
		Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD		
BMT	AQE/ASVAB	Mechanical	29	17	25	15	32	18	27	18	26	18	28	17	
		Administrative	63	12	60	13	59	15	56	20	59	18	59	18	
		General	63	11	59	9	57	14	54	17	63	15	63	14	
		Electronics	42	16	40	18	42	17	39	18	48	18	49	17	
		Non-Black													
		AQE/ASVAB	Mechanical	38	19	32	18	41	19	36	18	35	17	33	17
			Administrative	70	14	67	13	66	16	64	15	69	17	66	17
			General	70	13	67	12	67	15	65	14	71	16	70	15
	Electronics		54	18	47	16	55	19	52	18	60	18	58	18	
		Total													
		AQE/ASVAB	Mechanical	36	19	31	18	40	19	35	19	33	18	32	18
			Administrative	69	14	66	14	64	16	63	16	67	18	65	18
			General	69	13	66	12	65	15	64	15	69	16	69	16
	Electronics		52	18	47	17	53	19	50	19	58	19	56	18	

Table A3. Mean AQE/ASVAB Mechanical Scores for Male and Female Graduates and Eliminees in Technical Training Selected by the Mechanical Aptitude Index 1972 – 1974

Selector Level	1972						1973						1974					
	Graduate			Eliminee			Graduate			Eliminee			Graduate			Eliminee		
	N	Mean	SD	N	Mean	SD	N	Mean	SD	N	Mean	SD	N	Mean	SD	N	Mean	SD
Male																		
Black																		
M-40	763	48	9	58	48	7	704	50	11	100	48	9	430	52	12	61	48	11
M-50	155	55	9	17	53	9	194	58	10	43	56	10	187	58	10	28	57	9
Non-Black																		
M-40	4,240	60	16	151	52	11	3,771	59	15	193	52	12	3,051	67	17	125	56	14
M-50	1,330	64	13	45	60	9	1,546	63	14	79	62	14	1,973	69	14	110	69	12
Total																		
M-40	5,003	58	15	209	51	10	4,475	58	15	293	51	11	3,481	65	17	186	53	13
M-50	1,485	63	13	62	58	10	1,740	63	13	122	60	13	1,760	68	14	138	61	12
Female																		
Black																		
M-40		-	-	-	-	-	39	48	7	15	45	6	42	50	9	30	47	7
M-50		-	-	-	-	-		-	-		-	-	20	51	13	5	53	4
Non-Black																		
M-40		-	-	-	-	-	163	51	10	13	47	5	360	49	10	50	48	9
M-50		-	-	-	-	-		-	-		-	-	74	49	14	14	58	13
Total																		
M-40		-	-	-	-	-	202	50	9	28	46	6	402	49	10	80	47	8
M-50		-	-	-	-	-		-	-		-	-	94	49	14	19	56	11

Table A4. Mean AQE/ASVAB Administrative Scores for Male and Female Graduates and Eliminees in Technical Training Selected by the Administrative Aptitude Index 1972 - 1974

Selector Level	1972						1973						1974					
	Graduate			Eliminee			Graduate			Eliminee			Graduate			Eliminee		
	N	Mean	SD	N	Mean	SD	N	Mean	SD	N	Mean	SD	N	Mean	SD	N	Mean	SD
Male																		
Black																		
A-40	842	51	11	61	52	11	685	50	10	45	53	14	707	56	14	87	56	13
A-50	-	-	-	-	-	-	-	-	-	-	-	-	52	61	13	6	62	9
A-60	143	70	10	9	62	2	246	67	11	47	67	10	205	71	11	46	73	10
A-80	38	86	5	3	90	4	58	87	6	11	86	7	46	87	5	13	89	6
Non-Black																		
A-40	1,774	55	14	80	52	12	1,344	52	11	52	53	11	934	59	14	57	54	12
A-50	-	-	-	-	-	-	-	-	-	-	-	-	229	64	13	6	62	10
A-60	949	74	13	22	66	13	1,188	71	11	81	69	11	933	75	11	127	75	11
A-80	460	89	6	12	91	5	351	87	6	16	83	6	270	88	6	13	87	5
Total																		
A-40	2,616	54	13	141	52	12	2,029	52	11	97	53	12	1,641	58	14	144	55	13
A-50	-	-	-	-	-	-	-	-	-	-	-	-	281	64	13	12	62	10
A-60	1,092	73	12	31	65	11	1,434	70	11	128	68	11	1,138	74	11	173	75	11
A-80	498	89	6	15	91	5	409	87	6	27	84	7	316	88	6	26	88	5
Female																		
Black																		
A-40	153	59	12	9	54	17	175	54	12	5	52	12	147	60	15	9	59	8
A-60	37	67	9	4	71	4	57	68	9	18	71	11	47	74	12	7	65	5
A-80	5	81	2	1	85	1	7	86	5	1	80	0	-	-	-	-	-	-
Non-Black																		
A-40	602	60	13	22	63	12	596	56	12	26	56	11	400	64	15	17	61	15
A-60	288	73	11	12	70	10	396	70	10	64	72	11	209	75	11	24	77	12
A-80	105	87	6	8	85	7	67	88	6	5	83	6	-	-	-	-	-	-
Total																		
A-40	755	60	13	31	60	14	771	55	12	31	55	11	547	59	8	26	60	13
A-60	325	72	11	16	70	9	453	70	10	82	71	11	256	75	11	31	74	12
A-80	110	87	6	9	85	6	74	87	6	6	83	6	-	-	-	-	-	-

Table A5. Mean AQE/ASVAB General Scores for Male and Female Graduates and Eliminees in Technical Training Selected by the General Aptitude Index 1972 - 1974

Selector Level	1972						1973						1974					
	Graduate			Eliminee			Graduate			Eliminee			Graduate			Eliminee		
	N	Mean	SD	N	Mean	SD	N	Mean	SD	N	Mean	SD	N	Mean	SD	N	Mean	SD
Male																		
Black																		
G-40	1,215	48	8	83	48	8	1,592	49	10	103	49	11	1,342	59	13	125	61	13
G-50	92	56	8	3	55	4	63	59	10	6	55	6	151	64	11	14	59	8
G-60	547	66	9	30	68	10	648	67	9	71	67	8	916	72	10	99	71	9
G-65													6	79	9	5	76	5
G-80	48	60	15	15	64	12	33	83	5	14	82	3	45	84	5	30	84	5
Non-Black																		
G-40	4,012	55	14	123	51	11	5,435	53	13	172	52	13	4,234	64	14	148	63	13
G-50	1,375	65	12	11	67	14	701	63	12	13	55	6	1,141	69	13	38	67	12
G-60	3,807	73	12	102	69	10	3,504	73	12	131	70	10	3,178	77	11	175	73	11
G-65													39	86	9	2	78	3
G-80	467	77	15	57	68	16	449	87	7	44	85	5	442	88	6	64	85	5
Total																		
G-40	5,227	54	13	206	50	10	7,027	52	12	275	51	12	5,576	63	14	273	62	13
G-50	1,467	65	12	14	65	14	764	63	12	19	55	6	1,292	68	13	52	64	12
G-60	4,354	72	12	132	69	10	4,153	72	12	202	69	10	4,094	76	11	274	72	10
G-65													45	85	9	7	76	4
G-80	515	76	16	72	67	16	482	87	7	58	84	5	487	87	6	94	85	5
Female																		
Black																		
G-40							65	50	10	5	48	8	88	55	11	1	45	0
G-50							17	59	8	2	58	8	48	61	10	7	59	7
G-60	87	70	10	13	64	8	137	64	10	23	67	9	168	69	10	16	74	9
G-80	6	68	9	2	68	8	3	80	0	1	80	0	8	86	5	4	83	3
Non-Black																		
G-40							208	55	13	13	52	13	206	60	14	11	56	10
G-50							144	64	11	12	58	9	235	66	11	24	60	12
G-60	874	73	11	42	69	8	974	70	11	42	70	9	860	75	11	48	74	12
G-80	90	75	14	21	74	8	64	86	6	15	86	5	69	87	6	13	84	4
Total																		
G-40							273	54	13	18	51	12	294	58	13	12	55	10
G-50							161	63	11	15	58	9	283	65	11	31	60	11
G-60	961	73	11	55	68	8	1,111	69	11	65	69	9	1,028	74	11	64	74	11
G-80	96	75	14	23	73	8	67	86	6	16	85	5	77	87	5	17	84	4

Table A6. Mean AQE/ASVAB Electronics Scores for Male and Female Graduates and Eliminees in Technical Training Selected by the Electronics Aptitude Index 1972 - 1974

Selector Level	1972						1973						1974					
	Graduate			Eliminee			Graduate			Eliminee			Graduate			Eliminee		
	N	Mean	SD	N	Mean	SD	N	Mean	SD	N	Mean	SD	N	Mean	SD	N	Mean	SD
Male																		
Black																		
E-40	4	50	8	1	45	0	-	-	-	-	-	-	-	-	-	-	-	-
E-50	44	61	12	6	55	11	63	56	7	24	54	6	48	62	10	38	58	8
E-60	52	72	12	10	64	12	112	63	6	57	63	9	31	65	5	36	66	8
E-70	-	-	-	-	-	-	-	-	-	-	-	-	8	77	6	-	-	-
E-80	284	84	6	74	83	4	467	81	7	123	80	7	239	82	7	160	81	6
Non-Black																		
E-40	18	66	15	4	68	8	-	-	-	-	-	-	-	-	-	-	-	-
E-50	268	73	15	27	67	11	306	65	12	59	63	10	204	67	12	56	61	10
E-60	510	77	11	50	71	9	696	69	10	124	66	9	188	71	10	57	70	11
E-70	-	-	-	-	-	-	-	-	-	-	-	-	92	86	8	6	89	5
E-80	8,438	87	6	894	85	6	9,134	85	7	1,090	82	7	3,931	86	7	1,077	83	7
Total																		
E-40	22	63	15	5	63	12	-	-	-	-	-	-	-	-	-	-	-	-
E-50	312	72	15	33	65	12	369	64	11	83	60	10	652	70	10	94	68	10
E-60	562	77	11	60	70	10	808	68	10	181	65	9	219	70	10	93	68	10
E-70	562	-	-	-	-	-	-	-	-	-	-	-	100	85	8	6	89	5
E-80	8,722	87	6	968	85	6	9,600	85	7	1,213	82	7	4,170	85	7	1,237	83	7
Female																		
Black																		
E-50	-	-	-	-	-	-	-	-	-	-	-	-	7	56	5	3	60	7
E-80	-	-	-	-	-	-	20	77	7	25	76	6	34	81	7	51	80	7
Non-Black																		
E-50	-	-	-	-	-	-	-	-	-	-	-	-	21	60	8	5	56	4
E-80	-	-	-	-	-	-	462	81	8	168	78	8	468	81	7	268	79	7
Total																		
E-50	-	-	-	-	-	-	-	-	-	-	-	-	28	59	8	8	58	6
E-80	-	-	-	-	-	-	482	81	8	193	78	8	502	81	7	319	79	7